

the first steps in the formation of an embryo." These considerations become analogically of importance in leading us to the discovery of the real history of the *Olacaceæ*. Something in relation to this subject might be learned, if we could better understand the origin and development of the embryo under ordinary circumstances, for the facts are still undetermined that can prove which of the two theories of the nature of vegetable reproduction is founded on truth; the one maintaining that the pollen-grain penetrates the embryo-sac, and hence comes into immediate contact with the body of the nucleary vesicle, in order to effect its fertilization; the other denying this assertion, and declaring that it does not penetrate the sac, but merely discharges its function of impregnation, by external impression. Similar theories have long been disputed among zoologists, some contending that the spermatozoon does not penetrate the ovum in order to effect its impregnation, as mere external impact is sufficient to accomplish this function; while others declare the necessity of immediate contact, and that in proof of this they have seen the spermatozoa within the shell of the ovum. This point has just been determined by Mr. Newport, in a very interesting paper read before the Linnæan Society, in which he proves satisfactorily that the former view is conformable to truth. He has ascertained the important facts, that the presence of active spermatozoa are absolutely necessary to impregnate the ovum; that this is effected by simple impact; he has noted the time necessary to complete the operation, and has observed the internal change that immediately takes place in the body of the nucleus; and moreover he has found that the spermatozoa, after producing this effect by simple external impact, become inert and lose all power of motion. Mr. Newport has suggested that these circumstances, by analogy, may assist in determining the theories in dispute among vegetable physiologists; and he has pointed to the curious fact recorded by Mr. Griffith (Linn. Trans. vol. xx. p. 393) of the irritability or oscillatory motion seen within the boyaux of the pollen-grains of *Dischidia* at the period of impregnation of the ovules, which may perhaps be in some degree analogous to the vivacity of spermatozoa under parallel circumstances.

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XVI.—*Geographical Notices, and Characters of fourteen new species of Cyclostoma, from the East Indies.* By W. H. BENSON, Esq.

THE following new species of an interesting genus of operculated Land-snails belong chiefly to the mainland of India, and were collected in the Sikkim Himalaya; among the hills to the north-east of Bengal, and in the Peninsula of Southern India, from the

east near Bombay to its western shore. For the specimens from Southern India I am indebted to Dr. T. Jerdon, the illustrator of the ornithology of that quarter; a single species forms part of Dr. Cantor's acquisitions in Pulo Penang. I shall conclude with some remarks on the geographical distribution of ascertained Indian species, and on others which have been attributed, erroneously in my opinion, to the same country.

### 1. *C. Pearsoni*, nobis, n. s.

Testa umbilicata, depresso-turbinata, lævigata, obsolete spiraliter striata, supra castaneo marmorata et late fasciata, subtus spiraliter castaneo-lineata, fascia alba ad periphæriam, subtus altera nigro-castaneo concurrente ornata; spira depresso-conoidea, apice acuto; anfractibus 5 convexiusculis, ultimo lato, subtus convexo; apertura vix obliqua, ampla, circulari, intus cærulescente; peristomate expanso, undique reflexo, læte aurantio, marginibus callo brevi junctis; umbilico subangusto, pervio, intus angustiori.

Diam. major 42, minor 33, axis 25 mill.

*Hab.* in montibus Khasya dictis, ultra fines Provinciæ Bengalix, ad orientem spectantes.

Named after the late Dr. J. T. Pearson, of the Bengal Medical Service, a successful investigator of the natural history of Bengal, and formerly Curator of the Museum of the Asiatic Society of Calcutta. To him we owe the establishment of two interesting species of *Pterocyclos*, *P. parvus* and *P. hispidus*, in the Journal of that Society, and from him I received the species now described.

In form, sculpture, and markings *C. Pearsoni* much resembles, in the back view, the shell figured by Sowerby, no. 128. pl. 27. of the 'Thesaurus,' as *C. Perdix*, but the spire is less acute. It differs otherwise in the narrower umbilicus, in the orange colour and rounded edge of the peristome (which is destitute of the flatness observable in *C. Perdix*), as well as in the amplitude of the aperture, convexity and want of keel in the whorls, and in the absence of the articulated band at the suture. Can this be the shell alluded to by Sowerby in the following words? "Another variety has ventricose volutions and an orange-coloured aperture." It is probable that two or more distinct species were referred by Sowerby to *C. Perdix*, and that he has also figured two different species.

### 2. *C. Jerdoni*, nobis, n. s.

Testa umbilicata, depresso-turbinata, supra lineis elevatis spiralibus confertissimis corrugatis, strias obliquas decussantibus, subtus striis decussatis levioribus munita, albida, flammis fulguratis castaneis superne, et usque ad dimidium basis picta, fascia pallida mediana,

flammulis attenuatis articulata, cincta; spira depressa, apice prominula, sutura distincta; anfractibus 5 convexis, ultimo prope suturam depresso-planulato, periphæria subangulata; apertura vix obliqua, subcirculari, ad apicem angulata, peristomate expansiusculo, incrassato, albedo, ad umbilicum subreflexo; marginibus callo crasso junctis, umbilico mediocri, profundo, pervio, anfractus 2 exhibente.

Diam. maj. 35, min. 28, axis 20 mill.

Hab. ad latus montium "Nilgherries." Teste Jerdon.

Distinguished by its peculiar sculpture, more depressed form, rather wider umbilicus, and less expanded and less reflected peristome, from the white-lipped shell figured by Sowerby, Pl. Supp. no. 31 B. f. 321, as *C. Indicum*, Deshayes, and by Pfeiffer as *C. Ceylanicum*, Sowerby, who subsequently suppressed his MS. name. It is also less darkly coloured than that species, and the whitish ground forms a greater proportion in the markings. The red-mouthed var. of *C. Indicum*, figured by Sowerby, was sent to me by Dr. Jerdon as found on the opposite face of the Nilgherries.

### 3. *C. Aurora*, nobis, n. s. *2 Boudley 1952*

Testa anguste umbilicata, globoso-subturbinata, spiraliter 5-6 obsolete carinata, ferruginea, versus apicem rubente, oblique rugulosa; spira conoidea, apice obtusiusculo; anfractibus  $4\frac{1}{2}$  convexiusculis, ultimi periphæria obsolete angulata; apertura ampla, vix obliqua, circulari, superne angulata; peristomate continuo, expansiusculo, subincrassato, reflexiusculo, aurantio; fauce rubente.

Diam. maj. 28, min. 23, axis 19 mill.

Hab. ad Darjiling Regionis Sikkimensis ad montes Himalayanos.

This species is decorticate, but from the colouring apparent on the body-whorl within the aperture, where it is protected by a transparent enamel, it would appear that the fresh shell is surrounded, in the portion above the umbilicus, by narrow chestnut bands closely set. It is nearly related to a gigantic species from the same locality which is undescribed; but, having reason to believe, from a written communication made to me by Dr. Pfeiffer, that it is identical with an unedited species to which he has assigned the name *C. Himalayanum*, I refrain at present from describing it. The species in question is more depressed in proportion than *C. Aurora*, and being similarly decorticate, is white, with the exception of the peristome which is bright orange, and the apex which in my specimen is reddish. *C. Aurora* has also a narrower umbilicus.

### 4. *C. Cantori*, nobis, n. s.

Testa subanguste umbilicata, subgloboso-conoidea, spiraliter leviter striatissima, fulvida, sub epidermide albedo-cæsia, rufo-fusco marmo-

rata punctata et lineata, plerumque fascia unica nigrescente conspicua ad periphæriam cincta; spira conoidea, acuta; anfractibus 5 convexiusculis, primis oblique striatis, ultimi periphæria obsolete angulata; apertura ampla, circulari, subverticali, marginibus callo tenui junctis; peristomate expanso, sub-planato-reflexo; umbilico pervio. Operculo tenui, corneo, multispirato.

Diam. maj. 30, minor 23, axis 19 mill.; sp. major.

Diam. maj. 24, minor 19, axis  $14\frac{1}{2}$  mill.; sp. minor.

*Hab.* ad Insulam Penang. Teste Cantor.

I have thought it advisable to introduce this species here, in order that it may accompany the three preceding species and that immediately following, which, equally with it, belong to the same division of Pfeiffer's subgenus *Cyclophorus*. The shell forms part of a collection of Penang and Malay species, of which Dr. Cantor entrusted the publication to me, together with some interesting drawings of the inhabiting mollusks, which, I hope, will now shortly see the light.

##### 5. *C. porphyriticum*, nobis, n. s.

Testa mediocriter umbilicata, depresso-conoidea, tenui, striis confertissimis distinctis, elevatis, subundulatis, spiraliter munita, albida, superne saturate castaneo, subtus pallidiore ornata, maculis angulatis, circa suturam majoribus, conspersa, fasciis saturatis duabus albo-articulatis, altera ad periphæriam, altera inferiori cincta; spira brevi, apice acuto, sutura vix distincta; anfractibus  $4\frac{1}{2}$  planulatis, ultimo angulato, subtus planiusculo; apertura ampla, ovato-circulari, livide albida, peristomate tenui, expanso, reflexo, marginibus callo tenui junctis, conniventibus, columellari angustato, leviter emarginato.

Diam. major 31, minor  $24\frac{1}{2}$ , axis 18 mill.

*Hab.* in India Orientali.

Allied to *C. aquilum*, Sow., but differing in tenuity, depressed form, keel, and sculpture. I received this shell from Sowerby, in 1834, as one of the varieties of *C. Perdix*; however, the compressed form of the shell, its sharply sculptured striæ, and the characters of the aperture sufficiently justify its separation. In Sowerby's fig. 127, and in Küster's fig. 7. pl. 8, the columellar lip is expanded above the umbilicus, instead of being narrow and connivent with the superior margin. Sowerby omits any notice of the sculpture, and that which is ascribed to it by Pfeiffer is of a very different character. In form *C. porphyriticum* somewhat approaches *C. zebrinum*, mihi, but differs in sculpture, markings, less produced spire, less flattened underside, much wider umbilicus, and in the absence of the peculiar hispid epidermis which clothes that rare species. Sowerby, in his description of *C. zebrinum*, notes the umbilicus as moderate. In my original description (Journ. Asiat. Soc. Calcutta for 1836), I described it as

small; and, on comparison, it proves to be even narrower than that of *C. stenomphalum*, Pfeiffer. *C. porphyriticum* is also allied to, but quite distinct from, Mousson's *C. Zollingeri*.

6. *C. constrictum*, nobis, n. s.

Testa perforata, ovato-conica, glabra, costis angustis obliquis distantibus munita, translucente, albida vel rufula; spira elongato-conica, apice obtuso, sutura valde impressa; anfractibus 4 rotundatis, superioribus glabris, sequentibus remote costulatis, ultimo mox confertissime costulato-striata, pone aperturam strangulato, anticeque late constricto; apertura circulari, verticali,  $\frac{3}{8}$  longitudinis æquante, peristomate undique reflexo; operculo testaceo, multispirato, sutura inconspicua.

Diam. 2, alt.  $3\frac{1}{2}$  mill.

*Hab.* ad Darjiling Himalayæ Sikkimensis.

This shell has apparently an affinity with the Philippine *C. minus* of Sowerby, but differs in its more tapering form, smaller size, perforation, diverse sculpture, and in the strangulation of the last whorl behind the aperture, in which feature it exhibits an approach to the more shortened *C. gibbum*, Fér., from Turon in Cochin China, and to the depressed *C. strangulatum*, Hutton, so abundant in the more western portion of the Himalaya.

7. *C. floccinctum*, nobis, n. s.

Testa subaperte umbilicata, turbinato-globosa, infra spatium humerale glabrum lineis frequentibus elevatis cingulata, albida, epidermide fusca induta; spira elevata, subconica, sutura impressa, apice papillari; anfractibus  $4\frac{1}{2}$  rotundatis, ultimo cylindraceo; apertura circulari, superne vix angulata, prope umbilicum leviter sinuata,  $\frac{2}{5}$  longitudinis æquante; peristomate duplici, interiori simplici acuto, exteriori breviter reflexo; umbilico profundo, perspectivo.

Diam. maj. 3, minor  $2\frac{1}{2}$ , alt.  $2\frac{1}{2}$  mill.

*Hab.* ad apices montium Nilgherries. Teste Jerdon.

This little species is distinguished by the spiral ridges, which are numerous between the shoulder of the whorl and the umbilicus, but are deficient near the suture, as well as by its double peristome. The epidermis is deciduous.

8. *C. sarritum*, nobis, n. s.

Testa subimperforata, ovato-conica, liris spiralibus crebris, sulcis angustis divisis, munita, ferrugineo-albida, apice rubente, sutura bene impressa, apice obtuso; anfractibus 4 valde convexis; apertura vix obliqua, ovata,  $\frac{3}{8}$  longitudinis æquante, peristomate acuto, expansiusculo, marginibus disjunctis, columellari superne angulato, pariete calloso.

Long. 2, diam.  $1\frac{1}{4}$  mill.

*Hab.* in muscis arborum vallis profundæ, prope Cherra Poonjee, in montibus Garo dictis, præter fines Orientales Provinciæ Bengalæ.

I got specimens of this minute species, with other minute land shells as yet undescribed, in long tree moss, in which specimens of jasper, from the deep valley of Musmai, below Cherra Poonjee, had been packed on the spot.

9. *C. caeloconus*\*, nobis, n. s.

Testa subaperte umbilicata, turbinata, tenui, scabre confertim radiato-striata, olivaceo-lutescente, fascia unica submediana, strigisque undatis, radiatis, rufo-fuscis, ornata; spira conoidea, apice acutiusculo; sutura bene impressa; anfractibus  $4\frac{1}{2}$  valde convexis, ultimo cylindrico; apertura obliqua, ovato-circulari, peristomate tenui, acuto, umbilico profundo omnes anfractus exhibente.

Diam. major 13, minor 11, axis 9 mill.

*Hab.* ad radices montium Nilgherries Indiæ Orientalis. Teste Jerdon.

This shells holds an intermediate place between the planorbiform *Cyclostomata* and the turbinate *Cyclophori* with a moderate or narrow umbilicus.

10. *C. cuspidatum*, nobis, n. s.

Testa umbilicata, acuminato-conoidea, oblique striata, lineis spiralis circumdata, epidermide olivaceo-fusca; spira elongata, attenuata, apice mamillari; anfractibus 5, primis convexis, ultimo et penultimo superne convexiusculis, lira unica præditis, ultimo subtus convexo, periphæria carinata, carina lamellato-fimbriata; basi 3-lirata, lira subumbilicari fimbriata; apertura perobliqua, subcirculari, superne subangulata, dimidium longitudinis æquante, peristomate tenui, acuto, inargine columellari expansiusculo; umbilico mediocri profundo, anfractus plures exhibente.

Diam. major 6, minor 5, alt. 4 mill.

*Hab.* ad apices montium Nilgherries. Teste Jerdon.

This species is singular on account of its attenuated spire, and the hirsute lamellar appendages to the keels, at the periphery and umbilicus; but the latter character is apt to be obliterated.

11. *C. Trochlea*, nobis, n. s.

Testa anguste umbilicata, pyramidato-turrita, glabra, albida, apice obtusiusculo, sutura impressa; anfractibus 5, angulato-convexis, superne 1 carinatis, ultimo tricarinato, carina 1 superiori, 1 submediana, 1 circumumbilicari; apertura obliqua, circulari,  $\frac{2}{3}$  longitudinis æquante; peristomate acuta, ad finem carinæ inferioris vix angulato; umbilico pervio.

Diam. 2, long. 3 mill.

*Hab.* rarum in montibus Nilgherries. Teste Jerdon.

This minute shell is singular in its turritid form, and in the arrangement of its keels, which gives a flat cylindrical appearance to the periphery of the lower whorl. I do not know any species which can be compared with it.

\* κοίλος, *cavus*; κώνος, *conus*.

12. *C. aratum*, nobis, n. s.

Testa aperte umbilicata, orbiculato-depressa, ferrugineo-albida, unicolori, vel ferrugineo-marmorata et fasciata, spiraliter sulcata, sulcis radiato-striatis; spira elevatiuscula, apice acutiuscula; anfractibus  $4\frac{1}{2}$  convexis, ultimo cylindraco, antice descendente, dilatato; apertura ovato-circulari, valde obliqua, margine parietali angulato, calloso, superiori expanso, arcuato, obsolete crenulato, inferiori breviter reflexo; umbilico infundibuliformi omnes anfractus exhibente. Operculo calcareo multispirato, intus membrana induto, concaviusculo, extus carina elevata spirali subhorizontali munito.

Diam. major 18, minor 15, axis  $9\frac{1}{2}$  mill.

*Hab.* in Indiæ Orientalis Provincia "Northern Circars." Teste Jerdon.

Nearly allied to *subdiscoideum*, Sow., and *modestum*, Petit de la Saussaye, Journ. de Conchyl. 1850. It belongs to *Aperostoma*, Troschel, as well as the more conical *semistriatum*, Sow., which is a denizen of the opposite or western side of the Indian Peninsula.

In one specimen there is a broad interrupted band above, and a narrow darker band below the periphery.

13. *C. ravidum*, nobis, n. s.

Testa aperte umbilicata, subdiscoidea, nitidiuscula, confertim scabre tenuiter radiato-striata, olivaceo-lutea, sub epidermide alba; spira vix elevata, apice planato, obtuso, sutura impressa; anfractibus 4 convexiusculis, lente accrescentibus, ultimo cylindraco, antice vix descendente, superne prope suturam sub lente obsolete spiraliter striato; apertura obliqua, circulari, peristomate tenui, recto, marginibus callo tenui junctis; umbilico lato, perspectivo; operculo tenui, corneo, multispirato, extus concaviusculo.

Diam. major 15, minor 13, axis 7 mill.

*Hab.* ad apices montium Nilgherries Indiæ Meridionalis. Teste Jerdon.

The peristome is not quite perfect in the only specimen received by me from Dr. Jerdon, and some modification of its characters may be eventually necessary. The species differs from *C. annulatum*, Troschel, which has a similar operculum, in the more closely wound whorls, in the narrower umbilicus, more delicate sculpture, and absence of any pattern on the upper side.

14. *C. Phænotopicum*\*, nobis, n. s.

Testa subaperte umbilicata, depressa, subdiscoidea, tenui, non nitente, striis scabris, acutis, radiatis, elevatis, aliis impressis spiralibus, sub lente vix percipiendis, prope suturam decussatis, rufo-fusca, strigis angulatis, interruptis picta; spira depressa, apice prominula,

\* The name "Darjiling" Hellenized.

sutura impressa; anfractibus  $4\frac{1}{2}$  convexis, sensim accrescentibus; apertura circulari, peristomate tenui, recto, marginibus approximatis; umbilico profundo, perspectivo.

Operculo corneo, tenui, concaviusculo, arctispirali; anfractibus 7-8. Diam. major 12, minor 10, alt. 4 mill.

*Hab.* ad Darjiling, Himalayæ Sikkimensis.

With reference to its operculum and aperture it belongs to the third division of Pfeiffer's *Cyclophorus*. Although the larger of my two specimens does not bear the signs of age, yet, even if the peristome should be found to acquire a further development, the peculiar dull and sharp scabrous sculpture, as well as the narrower umbilicus, will serve to prevent the species from being confounded with any allied form, such as *C. annulatum* and *C. stenostoma*, which possess a similar operculum. The impressed spiral striæ are confined to the inner slope of the whorl, towards the suture, and are only visible under a lens. *C. planorbulum*, Sow., has a very different operculum, and belongs to *Aperostoma*, Troschel.

*C. stenomphalum*, Pfr., Zeitschr. 1846, and Conch. Cab. 2nd edition, p. 59. t. 8. f. 5, 6.—Pfeiffer notes that the habitat of this species is unknown, but that a smaller bleached specimen occurs in Dr. V. d. Busch's collection, marked "from Bengal." I have recognised this species in a shell sent to me by Dr. Jerdon from the island of Elephanta, near Bombay, where it was found by Brigadier Watson. Petit de la Saussaye, Journal de Conchyliologie, 1850, marks *C. stenomphalum* with doubt as a variety of *C. Indicum*, Desh., a species which has been productive of much disagreement among conchologists, e. g. Pfeiffer, Philippi, Sowerby, Mousson, and Petit. Philippi figured a shell for it which Pfeiffer, Mousson, and Petit agree in considering to be *C. oculus Capri*. Pfeiffer, however, refers Deshayes' original shell to the same, but Mousson and Petit agree in considering it distinct. Sowerby figured an orange-mouthed shell from the Nilgherries, which I received from Dr. Jerdon, as *C. Indicum*, and united it with a white-mouthed shell from Ceylon which he had named, in MSS., *C. Ceylanicum*. Under this name the latter variety is described by Pfeiffer, and figured by Küster. It is worthy of remark, that Belanger's specimen, described as *C. Indicum* by Deshayes, is from the same locality as my large specimen of *C. stenomphalum*.

With reference to Dr. Von dem Busch's small bleached variety, if the specimen should appear to have been received from Capt. W. J. Boys, I should have little hesitation in assigning to it the locality of Bhamoury, at the foot of the Western Himalaya, on the road leading to Almorah, where a very similar shell was



discovered by that officer in 1843, on the day following that on which I had bespoken his attention to terrestrial and fluviatile conchology at the neighbouring mountain-lake "Bhimtâl." I have not access, at present, to a specimen, so as to be able, at once, to confirm or reject the supposition.

*C. funiculatum*, nobis.—Sowerby in his Supplement to his Monograph has figured this species, and cited the Khasya Hills as the habitat. I have never heard of its existence in that quarter. My first specimen was obtained from Darjiling in the Sikkim Himalaya, as stated in the Journ. Asiat. Soc. Calcutta, 1838, as were also those which I subsequently sent to Mr. Cuming, and furnished to Sowerby for the purpose of being figured. Even in the adjoining country of Bhotan the species appears to give place to *C. pauperculum*, Sowerby, and direct evidence is necessary to establish its habitat in the mountain-group to the south and east of the river Burhampooter.

*C. stenostoma*, Sow.—Sowerby gives Arabia, without any definite locality in that extensive tract, for this species, on the authority of Mr. Powis. The Paris Museum, according to Pfeiffer, gives the habitat as Pondicherry, and the large variety figured in Küster, pl. 20. f. 18, 19, is stated to have been received by Dr. Pfeiffer from Delessert as from Cochin China. Dr. Jerdon sent it to me from woods at the top of the Nilgherries, where the small variety occurs as well as specimens equalling in size that above referred to. It can hardly inhabit such various elevations, or exist under such different hygrometric conditions as are necessarily involved in all these assigned localities.

*C. Menkeanum*, Philippi.—Pfeiffer has no information regarding the locality of this species. It proves to be the shell which I found abundantly near Point de Galle, and which I regarded as a variety of *C. Involvulus*. Unfortunately nearly all my specimens, including beautifully marked varieties, were abstracted, with other shells, from my baggage, on a railway, soon after my arrival in England. Petit cites Ceylon, with a note of interrogation; I am glad to be able to confirm his conjecture. I have also a specimen from a collection of shells made at Trincomalee.

I now proceed to give a geographical view of the species inhabiting Hindustan, the neighbouring mainland, and the islands in view from their shores, as far as our information extends at present.

We know of no species from Affghanistán, and the Punjáb has not as yet contributed anything to the genus. Beginning at the north-west, *C. strangulatum*, Hutton, ranges along the secondary heights of the Himalaya from the Sutlej as far as the western border of Nipál, where the observations of conchological

inquirers have hitherto abruptly terminated. At one spot, near this border, a goodly-sized *Cyclophorus*, possibly the small variety of *C. stenomphalum*, Pfr., appears at Bhamoury, a few feet above the point where the Lower Himalaya springs from the forest of the Terai. Proceeding along the Himalaya, to the east of Nipal, Darjiling, in Sikkim, furnishes *C. Himalayanum*? Pfr. MSS., *Aurora*, *constrictum*, *Phanotopicum*, and *funiculatum*, nobis, and the country of Bhotán *C. pauperculum*, Sow., a species nearly allied to the last. Crossing the Burhampooter river, the hills to the south of Assám present us with *C. zebrinum*, *Pearsoni*, and *sarritum*, nobis, also with *Pterocyclos hispidus*, and *parvus*, Pearson.

Singular as it may appear, the whole of the extensive tract of Gangetic plains stretching from the Desert west of the Jumna to the seaboard of the Delta, in Bengal, fails to furnish a single species, except where the rocks of the mountain-ranges south of the Ganges impinge on the stream below Patna in Bahar. At these places *C. Involvulus*, Müll., and *Pterocyclos rupestris*, nobis, make their appearance, but they seem to be interrupted towards the west by the sandstone formation of the Vindhyan chain. Still further west, and north of the Nerbudda river, *C. semi-striatum*, Sow., appears at Neemuch, in lat. 25° N., and extends to the south as far as Poonah, which lies south-east of Bombay. On the eastern side its place is taken, in the Northern Circars of Madras, by *C. aratum*, nobis, where according to Jerdon this species is accompanied by *Pterocyclos rupestris*.

Near Bombay again, at Elephanta, *C. Indicum*, Desh., and *C. stenomphalum*, Pfr. (the large var.) are found, the former extending to the Nilgherries, where *C. Jerdoni* and *cæloconus*, nobis, *stenostoma*, Sow., *Trochlea*, *ravidum*, *cuspidatum* and *flocinctum*, nobis, also *C. nitidum*, Sow. (on the authority of Pfeiffer and Mr. Cuming's collection), add materially to the list, while at their eastern base the singular *Pterocyclos bilabiatus*, Sowerby, occurs.

Descending southward to the rich island of Ceylon, we find *C. Menkeanum*, Phil., *Ceylanicum*, Pfr. (if distinct from the true *Indicum*), *C. annulatum*, Trosch., *halophilum*, nobis, *helicinum*, Ch., *Itieri*, Guérin (*cornu venatorium*, Ch.?), and *Hoffmeisteri*, Trosch., of which the specimens found by myself at Galle, and agreeing apparently with Troschel's short description, cannot be confounded with Küster's figure of the species previously named. To the same island belong also the magnificent *Pterocyclos Cumingi*, Pfr., recently published\*, and a fine species captured by Dr. Bland at Trincomalee.

\* In the 1st No. of the 'Zeitschrift' for 1851, Pfeiffer publishes a review of *Pterocyclos* as at present known, following the synonymy given in my *Ann. & Mag. N. Hist. Ser. 2. Vol. viii.* 13

Taking up the thread dropped east of the Burhampooter river, and descending through the Burmese territories and the Malayan peninsula, we find at Tavoy and Tenasserim, Pulo Penang and Malacca, *C. aurantiacum*, Schum. (*pernobile*, Gould), *sectilabrum*, Gould, *Perdix*, Sow., *Cantori*, nobis, *semidecussatum* and *Tuba*, Sow.; and at Singapore, near the extremity of the peninsula, *C. aquilum*, Sow., and *rostellatum*, Pfr., *Zeitschr.* No. 1, 1851; in the Siamese territory, *C. Siamense*, Sow.; in Cochin China, *C. gibbum*, and *stenostoma*, with *Pterocyclos anguliferus*, Souleyet; and in Southern China, *C. punctatum*, Grateloup (*irroratum*, Sow.), rightly attributed by Sowerby to that country, whence I have received it through Dr. Cantor, but assigned by Grateloup to Ceylon. At Pulo Susson, near Penang, a very distinct species of *Pterocyclos* was taken by Dr. Bland; and on the same island Dr. Cantor procured the small pale variety of *C. nitidum*, Sowerby, a species which is very widely spread, appearing in the Nilgherries as well as in Java and the Philippine islands. *Pterocyclos biciliatus*, Mousson, of which only an imperfect specimen has been observed, belongs to Burmah.

Sowerby has referred *C. undulatum* to Bengal. I have never heard of its existence there, and I obtained a specimen at the Mauritius from Sir David Barclay, from the shore to the south of the harbour of Port Louis. *C. cinctum*, Sowerby, is also cited by that author as an East Indian shell. It has all the characters of a group from the islands of East Africa, and Petit gives Madagascar as the habitat. Sowerby and Petit are equally at variance regarding the habitat of another insular African form, *C. filosum*, Sow., who calls it a rare East Indian shell. Sir D. Barclay presented me with a specimen taken in the island of Rodriguez. *C. Belangeri*, Pfr. (*aurantiacum*, Desh.), is noted as found only in the environs of Pondicherry. The type is oceanic, and I have lately found two undoubted specimens among shells sent from the Mauritius as *C. Rangii*. May it not have been imported into the French Indian settlement, with plants, from that island?

Great diversity of opinion exists regarding the true *C. planorbulum* of Lamarck. A gigantic species which I observed last year, in the Senkenberg Museum, at Frankfurt am Main, appears to me to agree better with the figure copied in pl. 29. f. 18 of Küster, than any other form attributed to it. It is labelled

paper in the 'Annals' for 1848, except in recognising correctly *Pt. anguliferum*, Souleyet, from Cochin China as a separate species, and adding some forms since described. Nine true *Pterocycli* are admitted, only one (*C. spiracellum*, Ad. and Reeve) being doubtful, and two species of the transitional form *Myxostoma* of Troschel. Dr. Bland's two undoubtedly distinct species would, if accessible for description, increase the number of true *Pterocycli* to eleven.

